Small Business Innovation Research/Small Business Tech Transfer

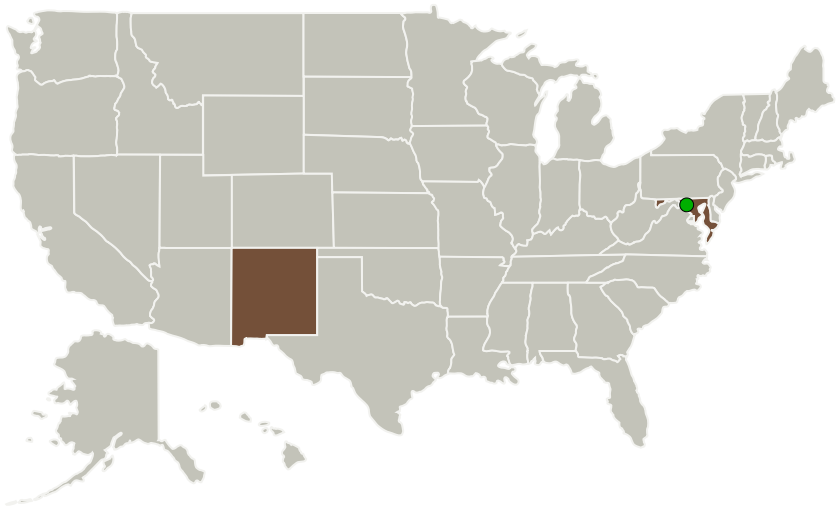
All Optical Vector Magnetometer, Phase I

Completed Technology Project (2013 - 2013)

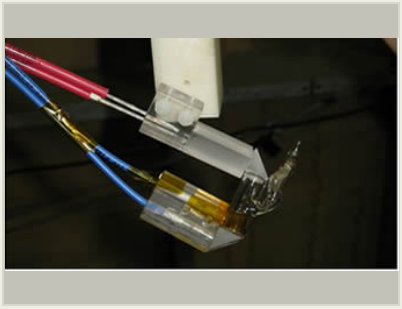
Project Introduction

This Phase I research project will investigate a novel method of operating an atomic magnetometer to simultaneously measure total magnetic fields and vector magnetic fields. Magnetometry has provided critical scientific information throughout the history of space exploration. The ideal magnetic sensor for space applications would be one which shares the advantages of the fluxgate (vector precision, robust operation) with the precision and absolute accuracy of the atomic magnetometer. Our approach will result in an all-optical vector magnetometer (AOVM) that can be calibrated from the fundamental quantum properties of the atoms. Stable calibration is essential if magnetic dynamics are to be inferred by flying different missions to the same planet separated by decades. The sensor and electronics will be small and lightweight and operate from a few Watts of electrical power.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Southwest Sciences, Inc.	Lead Organization	Industry	Santa Fe, New Mexico
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland



All optical vector magnetometer

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Primary U.S. Work Locations	
Maryland	New Mexico

Project Transitions

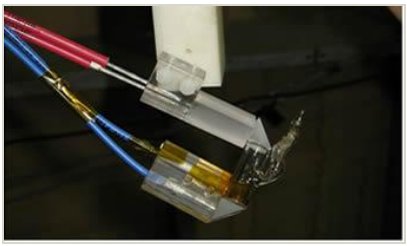
May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137990)*

Images



Project Image
All optical vector magnetometer
(https://techport.nasa.gov/image/134327)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Southwest Sciences, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

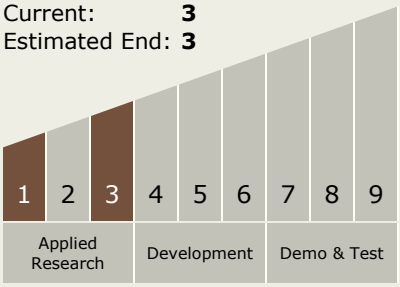
Carlos Torrez

Principal Investigator:

David C Hovde

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.2 Electronics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System